Emotional Data Visualised - EDV

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This installation is an attempt to reflect the emotional state of a population of people. Emotional Data Visualised (EDV) poses the question: In a post-pandemic digital world how can we be expressive in a subtle yet personal way? EDV reflects the observation and the curiosity by the authors examining how mixed reality and Internet of Things (IoT) technology can be used to directly reflect peoples' feelings.

Keywords: Emotional expression, Affective Engineering, Internet of Things, Data Visualisation.

1. BIOGRAPHIES

Tom Flint is a Lecturer at Edinburgh Napier University. His work examines cultural experiences. His creative technology practice is in collaboration with artists, helping to bring their context into digital technology. He also works with Arts organisations to contextually digitise collections.

Linda Shore is a UX Designer/Researcher at Edinburgh Napier University, and more recently Glasgow School of Art. Investigating User eXperience and peoples' behavior present her with research challenges and opportunities which rely on qualitative approaches to explore and define unmet needs demonstrating her curiosity creatively expressed through and by design.

2. OUTLINE OF THE WORK

Emotional Data Visualised (EDV) is an IoT enabled method of gathering direct feedback from a population of people. It is a touch free method of gathering emotional expression and responding directly to an audience. Gathering Emotional Data has been relied on from a creative perspective previously (Andrews, n.d.) which highlights the curiosity and motivation for people to be expressive in public spaces.

The Interactions gallery as a public space enhances contextual curiosity to understanding further the perceptions, interactions and behaviours of people (Dalsgaard, et al., 2016) - the BCS HCI conference attendees.

In addition, the participation gestalt presents an opportunity to offer alternative expression points, including the plinth itself with the provision of materials e.g. Post-it notes and Sharpie markers to place or state written/sketched perceptions and expression upon.

EDV gathers data from a responsive HTML page that is available on participants' personal devices. The HTML page aims to gather emotional data from participants which is subsequently displayed.

People are invited to:

1. Scan (the QR code)
2. Select (express how they feel)
3. See (the orb responds by changing colour) (see figure 4).

The output for this installation is through RGB LEDs that respond directly to user input. The output is currently presented as a orb on a plinth but can be iterated into other forms and outputs.
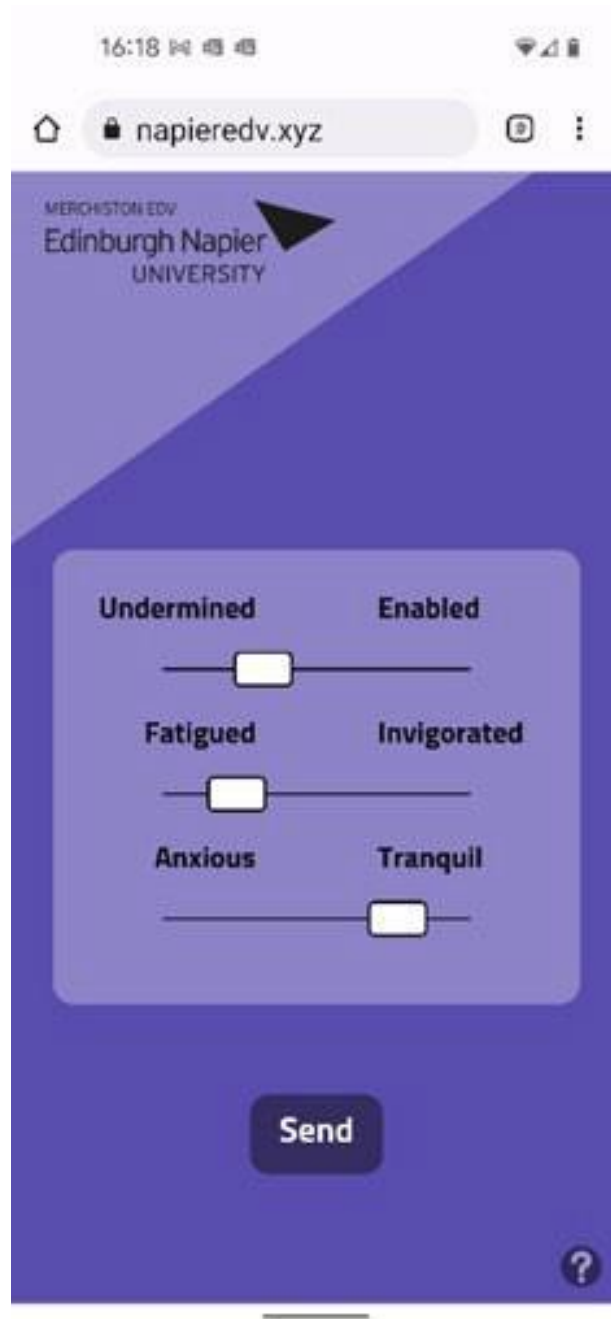
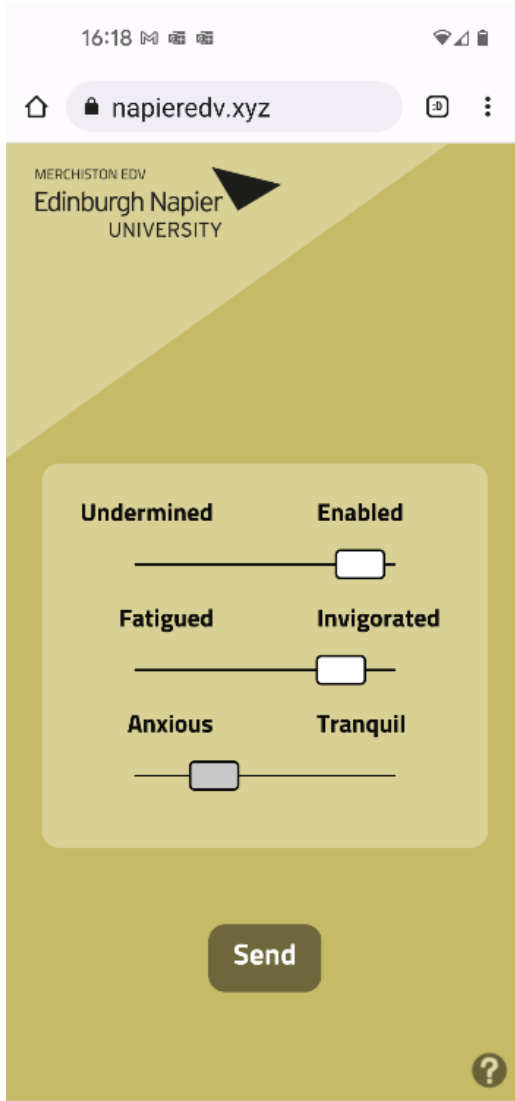**Figure 1:** *Screenshot of input interface*

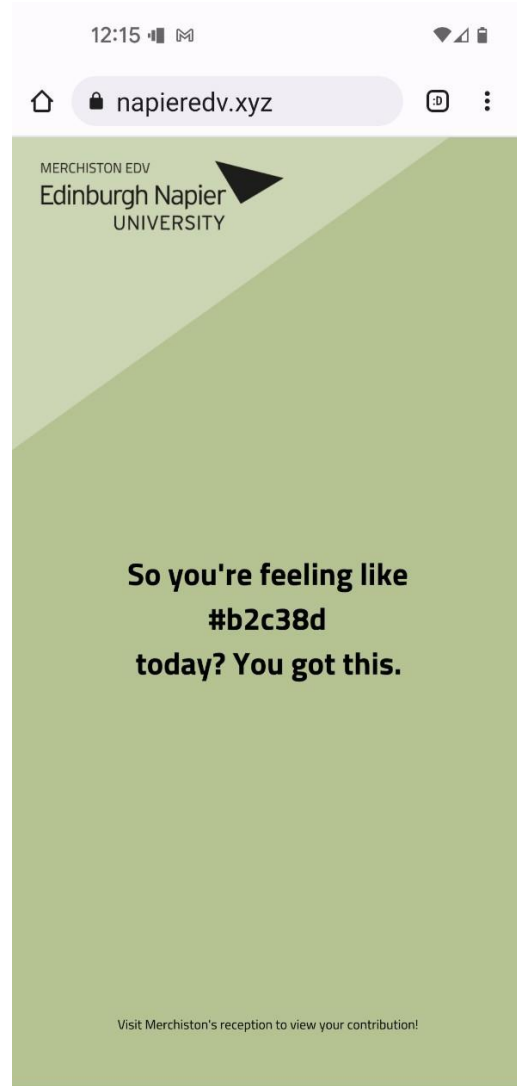*Figure 2: Interface changes to reflect input*

Figure 3 The mobile interface responds to the input

EDV responds and changes colour as a direct response to the most recent participant's input. RGB values are stored on a remote database managed by a third party specifically for third party distribution on IoT technologies. The physical manifestation of the stored data is a large opaque orb with an IoT enabled Arduino device (MKR1000) attached to RGB LEDS.

10 RGB LEDS on the front of the plinth document legacy inputs the 10 most recent expressions input from the app.

The orb itself glows in a colour that represents the mean value input into the EDV over its lifetime. By displaying the mean RGB value in the orb EDV demonstrates an immediate and meaningful response to user input over time.

3. RATIONALE

EDV is a device with which to explore participation gestalt. Its form was conceived over a number of creative workshops that considered and examined user input and feedback. We were particularly interested in gaining responses that represented emotional state and expression pre and post pandemic.

Our starting point was to consider the experience of transition from pandemic to a post pandemic time. On occasion we may wish to express how we feel privately and through technology as a means to feel better or 'encalmed' (Weiser & Brown, 1996).

EDV is considered as a replacement for touch-based feedback systems, and offers transferrable and adaptable settings to optimise capacity in various contexts and environments.

Figure 4: *Plinth and orb output*

4. TECHNICAL DESCRIPTION

EDV works by transferring a HEX code of the RGB pairs input by the user to a Thingspeak channel. The Thingspeak channel performs the necessary calculations to create a mean for the orb. The Orb contains a WIFI enabled Arduino MKR1000.

The Arduino interrogates the Thingspeak channel to ascertain the last 10 inputs to display on the front of the device and the mean of the inputs to display on the orb. The orb is lit by a set of 100 RGB LEDS. EDV has minimal technical requirements. Power is needed via a USB socket. A suitable USB output that can be plugged into a 13AMP socket will accompany the installation. EDV requires straightforward Internet connection e.g. with a web-based HTML that works in a browser, independent of operating systems e.g. IOS, Android.

CONCLUSION

By gaining emotional expression directly from peoples' devices EDV provides a means to express and avoid contamination from touching surfaces. EDV has been trialled successfully to encourage expression from the community of a University providing promising indicative results.

FUTURE WORK

There is scale-up opportunity in other settings and environments that have high footfall and population transition, e.g. hospitals, waiting rooms, train stations which could enhance understanding of peoples experience and interaction expression in public spaces.

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